

Site Exposure Potential

Chemical Insecticide Corporation

Edison Township, New Jersey
Region 2
NJD980484653

Chemical Insecticide Corporation (CIC) is an abandoned, 2.3-hectare pesticide manufacturing facility in Edison Township, New Jersey (Figure 1). From 1958 to 1970, CIC produced insecticides, fungicides, rodenticides, and herbicides, including 2,4,5-trichlorophenoxy-acetic acid (2,4,5-T), noted for being contaminated with dioxins and related compounds. Improper manufacturing and product handling resulted in numerous complaints and citations against the company during the period of operation. The company went bankrupt in 1970 and in 1975 all buildings were demolished, leaving only concrete building pads, residual roadways, buried drums, and debris on the site (Ebasco 1990).

On-site surface water includes small amounts of standing water and numerous erosional drainage channels. The erosion channels flow eastward and discharge into a drainage ditch adjacent to the eastern site boundary. The ditch leads to a subsurface storm drain system that discharges to an unnamed creek. This unnamed creek flows for about 450 m before discharging into Mill Brook, which enters the Raritan River 3.5 km downstream.

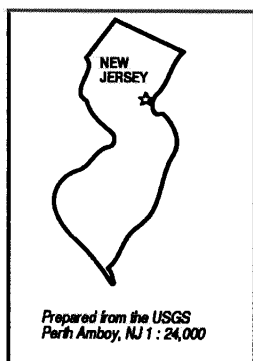
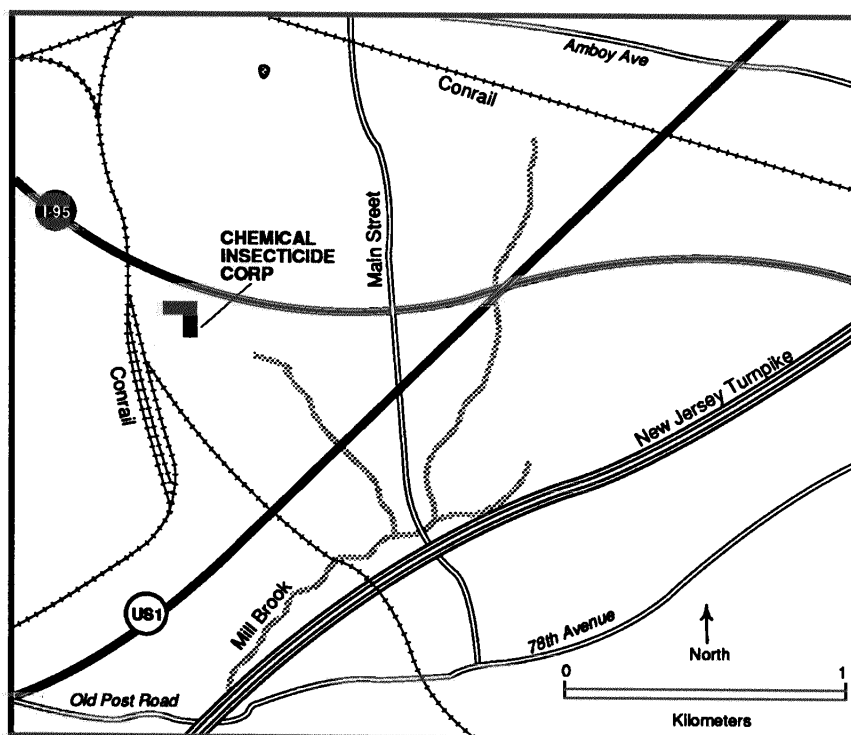


Figure 1.
The Chemical
Insecticide
Corporation,
Edison Township,
New Jersey.



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Site Exposure Potential, *cont.*

The CIC site is underlain by several aquifers. Measurements from both on-site and nearby wells have indicated that groundwater in both shallow and deep aquifers generally flows to the east.

Surface drainage, remnant floor drains, and exposed sewer lines suggest the presence of an on-site sewer system. Chemicals used on the site may have been disposed of into this system.

Based on site characteristics and historical practices, surface water transport through the storm water collection system that discharged into the unnamed creek is the major pathway of contamination to NOAA resources. Groundwater in the shallow aquifer may contribute some contaminants if it enters the surface drainage to the east of the site (unnamed tributary). Contaminated sediment and soil represent secondary sources of contamination and may be transported off-site by surface or subsurface drainages.

Site-Related Contamination

Results from the RI (Ebasco 1990) confirmed that surface water, groundwater, soil, and sediment from the CIC site and nearby areas are contaminated with a variety of chemicals, including inorganic substances, pesticides, PCBs, and dioxin/furans. Low concentrations of numerous volatile and semi-volatile organic compounds were detected at the site. Tables 1 and 2 (Ebasco 1990) show contaminant concentrations that are of major concern to NOAA.

On-site groundwater was contaminated with eight trace elements, with arsenic and mercury present at exceptionally high levels. Concentrations of these substances were substantially lower in off-site groundwater. Maximum concentrations of inorganic contaminants in surface water were substantially lower than the concentrations in groundwater. Arsenic, cadmium, copper, nickel, and zinc exceeded their respective chronic AWQC in on-site surface water while only chromium, copper, and zinc exceeded their respective AWQC in surface water off-site.

Polychlorinated dibenzodioxins (dioxins) and related compounds were measured in groundwater, surface water, sediment, and soil at the CIC site. The maximum concentration of total dioxins in groundwater on-site was 0.0004 µg/l, 40 times greater than the

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Site-Related Contamination, *cont.*

Table 1.
Maximum concentrations (µg/l) of contaminants of concern at the Chemical Insecticide site.

chronic freshwater AWQC (there are no marine AWQC). No dioxins were detected in off-site groundwater samples. Total polychlorinated dibenzofurans (furans) were detected in one on-site surface water sample at 0.00024 µg/l. No dioxins or furans were detected in off-site surface water but were detected in on-site sediment and soil at very high levels.

Groundwater			Surface Water		AWQC ¹
On Site	Off Site		On Site	Off Site	Marine Chronic
INORGANIC SUBSTANCES					
arsenic	89200	63	1680	6.4	36
cadmium	1840	13	10	3	9.3
chromium	855	277	31	90	50
copper	2600	117	19	11	2.9
lead	543	136	<6.7	NR	5.6
mercury	47	ND	ND	NR	0.025
nickel	1560	414	46	NR	8.3
zinc	3890	1420	287	428	86
ORGANIC COMPOUNDS					
Pesticides					
alpha BHC	3400	0.2	<1.8	0.2	NA
gamma BHC	1400	NR			0.16**
dieldrin	55	NR	<0.3	<0.1	0.0019
endrin	230	ND	<0.3	<0.1	0.0023
DDT	2100	0.3	2.5	<0.1	0.001
chlordane	88	ND	ND	ND	0.004
Total Dioxins	.0004	ND	ND	ND	NA
1: Ambient water quality criteria for the protection of aquatic organisms. Marine chronic criteria presented (EPA 1986).					
** Marine acute criteria presented, no chronic criteria available.					
ND: Not detected at method detection limit.					
NR: Not reported.					
NA: Screening level not available.					

Contaminants in the soil showed a pattern similar to the contamination in the sediment with both on-site and off-site concentrations exceeding the average levels observed in U.S. soil. Chromium was the only element that was present in soil at higher concentrations off-site than on-site.

Trace elements were detected in sediment on- and off the site at concentrations above ER-L values (Long and Morgan 1990). Arsenic concentrations were greatly elevated on-site. Arsenic (15 mg/kg), cadmium (1.5 mg/kg), and lead (59 mg/kg) were detected in sediment from Mill Brook. Concentrations of other trace elements were not reported for Mill Brook sediment. Chromium, copper, and zinc had higher concentrations off-site than on-site.

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Site-Related Contamination, *cont.*

Table 2.
Maximum concentrations (mg/kg) of contaminants in sediment and soil from the CIC site.

	Soil			Sediment		
	On-Site	Off-Site	Average U.S. Soil ¹	On -Site	Off-Site	ER-L ²
INORGANIC SUBSTANCES						
arsenic	8010	24	5	2660	79	33
cadmium	177	6	0.06	21	9.4	5
chromium	128	196	100	39	133	80
copper	4410	83	30	150	216	70
lead	1980	80	10	1170	1130	35
mercury	72	0.6	0.03	0.7	0.2	0.15
nickel	119	108	40	143	38	30
zinc	1040	226	50	552	1840	120
ORGANIC COMPOUNDS						
alpha BHC	45000	0.031	NA	590	.012	NA
gamma BHC	23000		NA	0.25	ND	NA
dieldrin	17.0	ND	NA	1.9	0.063	0.0004
DDT	6900	0.240	NA	820	0.074	3
chlordane	39	ND	NA	ND	ND	NA
PCBs	ND	ND	NA	0.42	10	50
Total Dioxins	0.0073	0.000022	NA	0.00079	ND	NA
TCDD	0.0018	ND	NA	0.00076	ND	NA
Total Furans	0.079	ND	NA	0.0091	ND	NA
1: Lindsay (1979).						
2: Effective range-low; the concentration representing the lowest 10 percentile value for the data in which effects were observed or predicted in studies compiled by Long and Morgan (1990)						
ND: Not detected at method detection limit						
NA: Screening level not available						

Elevated concentrations of several pesticides were observed in groundwater on-site (Table 2). Pesticides were reported to be substantially lower in off-site groundwater samples, although results were not presented for all pesticides. Pesticide concentrations in surface water were reported to be less than the detection limits. However, the detection limits used for dieldrin, endrin, and DDT were much higher than their chronic marine AWQC. Pesticides were measured at high concentrations in sediment on site, particularly for a-BHC, dieldrin, and DDT, but sediment cores were lower off-site (Table 2). Pesticide concentrations were also high in soil on the site, but were lower in off-site soil. PCBs were not detected in surface water or groundwater samples from the CIC site or adjacent areas.

NOAA Trust Habitats and Species

Mill Brook is in a heavily industrialized area and has had chronic pollution problems. The New Jersey Department of Environmental Protection has not surveyed the stream since 1980; it is not known whether pollution abatement efforts have since restored anadromous species use of the stream. Blueback herring, alewife, blue crab, silverside, American eel, and mummichog may have used

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NOAA Trust Habitats and Species, *cont.*

the stream, especially in the lower reaches near its confluence with the Raritan River (Stuart personal communication 1990). The Raritan River serves as habitat for migratory and estuarine-dependent marine fish (Table 3; Boriak personal communication 1990; Stuart personal communication 1990). The Raritan River is a major crabbing and fishing area, though only blue crab are harvested commercially. Recreational fisheries exist for blue crab, bluefish, striped bass, American shad, American eel, white perch, and summer flounder. American shad have been stocked in the upper Raritan River to encourage the restoration of a fishery upriver, but spawning has yet to occur (Boriak personal communication 1990).

Table 3.
Species and
habitat use in
the lower
Raritan River.

Species		Habitat		Adult
Common Name	Scientific Name	Spawning	Nursery	Forage
INVERTEBRATES				
blue crab	<i>Callinectes sapidus</i>	♦	♦	♦
grass shrimp	<i>Hippolyte sp.</i>	♦	♦	♦
ANADROMOUS/CATADROMOUS FISH				
blueback herring	<i>Alosa aestivalis</i>	♦	♦	♦
alewife	<i>Alosa pseudoharengus</i>	♦	♦	♦
American shad	<i>Alosa sapidissima</i>		♦	♦
American eel	<i>Anguilla rostrata</i>			♦
striped bass	<i>Morone saxatilis</i>		♦	♦
ESTUARINE/MARINE FISH				
mummichog	<i>Fundulus heteroclitus</i>			♦
tidewater silverside	<i>Menidia beryllina</i>			♦
Atlantic silverside	<i>Menidia menidia</i>		♦	♦
white perch	<i>Morone americana</i>	♦	♦	♦
bay anchovy	<i>Anchoa mitchilli</i>	♦	♦	♦
Atlantic menhaden	<i>Brevoortia tyrannus</i>		♦	♦
weakfish	<i>Cynoscion regalis</i>	♦	♦	♦
summer flounder	<i>Paralichthys dentatus</i>		♦	♦
bluefish	<i>Pomatomus saltatrix</i>	♦		
winter flounder	<i>Psedopleuronectes americanus</i>		♦	♦

Fishing advisories are in effect in the Raritan River for American shad, striped bass, bluefish, and white perch due to high levels of PCB contamination (Boriak personal communication 1990).

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